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Workers' Commuting Migration from District to City of Semarang by Rapid Transit Busses

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Abstract

Migration phenomena, especially internal migrations which are usually called commuting migration, take place almost in the entire parts of Indonesia. One commuting migration phenomenon is shown by workers of Semarang District. The purpose of this study is to partially analyze the influence of income, education, marital status, land ownership, sex, and age variable upon workers' commuting decision of Semarang District. This study uses both primary, obtained from questionnaires of 100 respondents, and secondary data. The results of binary logistic regression model analysis in this study show that two independent variables of income and education significantly influence workers' commuting decision while marital status, land ownership, sex, and age variable do not influence workers' commuting decision. Assuming that income expected from city is higher, it results in workers' commuting flows. Indicates that the higher their educational level, the greater their probability to commute to the city, and vice versa. This is relevant with Ravenstein's migration theory that people with higher educational level usually mobilize more than those with lower educational level. From the calculations, it shows that workers' commuting probability may increase as respondents' income and education increase as well.

Keywords: *commuting migration; binary logistic regression; commuting decision*

INTRODUCTION

One socio-economic development challenge in developing countries such as Indonesia is on population problems, such as explosion and uneven distribution of population (Prajanti, 2015). Rural and urban areas' development gaps lead to uneven distribution of population. Such conditions encourage people to move or migrate. Mantra (2003: 186) explains that people's main motivation to move from rural to urban areas is the economic reasons. These motives develop due to regional economic gaps. Based on rational consideration, individuals' mobility to urban areas is the expectations to have better jobs and income than those in rural ones.

Migration phenomena, especially internal migrations which are usually called commuting migrations, take place almost in the entire parts of Indonesia. Internal

Table 1. Over 15 year- old people in Work Force period of Semarang, Demak, and Kendal District of 2013

No	District	Work Force Period		Total
		Working	Unemployed	
1	Semarang	511,957	20,718	532,675
2	Demak	493,169	37,371	530,540
3	Kendal	452,169	31,043	483,212

Source: National Work Force Period Survey (SAKERNAS), BPS

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Table 2. MSE comparison of Semarang City with Demak, Kendal, and Semarang District of 2011 – 2013

Year	Semarang City	Demak	Kendal	Semarang District
2011	961,323	847,987	843,750	880,000
2012	991,500	893,000	904,500	941,600
2013	1,209,100	995,000	953,100	1,051,000

Source: Manpower, Transmigration, and Population Department of Java Province

Table 3. Number of Trans Semarang RTBs Passengers in Corridor II of Sisemut (Ungaran)-Terboyo

Month	Year	Number of Passengers		
		Public	Students	Total
Januari	2013	60,893	13,233	74,126
Februari	2013	61,869	15,293	77,162
Maret	2013	82,746	14,101	96,847
April	2013	87,162	16,231	103,393
Mei	2013	99,115	16,379	115,494
Juni	2013	108,354	12,687	121,041
Juli	2013	123,831	19,940	143,771
Agustus	2013	127,382	15,304	142,686
September	2013	133,256	26,158	159,414
Oktober	2013	133,207	27,372	160,579
November	2013	135,916	26,501	162,417
Desember	2013	142,996	21,821	164,817

Source: Public Service Agency (BLU) of Semarang City on RTBs

migrations or commuting migrations are considered as natural processes distributing surplus of work forces from urban to modern sectors in rural areas which absorb more work forces (Todaro, 2006: 401). One commuting migration phenomenon is shown by workers of Semarang District. Due to limited conditions of employment but surplus in work forces, those encourage people to commute from rural to urban areas to work or get a job.

Table 1 shows a comparison between numbers of work force period in areas directly close to Semarang city. District categorized in the highest work force period in 2013 is Semarang with 511,957 people. It can be concluded thatcommuting migration may highly occur in Semarang district due to its highest number of Work forces. The work forces in this area may not be entirely absorbed that the workers move to urban areas to work or get a job.

City/District Minimum Salary (MSE) difference is another main reason for workers deciding to commute beside limited job opportunities factor in rural areas. Rationally, they will not move to urban areas if salary in rural areas is higher or equal to that in urban areas (Todaro, 2006: 407).

Table 2 shows that residents of Semarang District will obviously decide to move to Semarang city as Semarang MSE is always higher than that of Semarang district and others in Central Java such as, Demak and Kendal.

In addition, the availability of transportation facilities and infrastructure such as Rapid Transit Busses (RTBs) also supports people from Semarang District to commute to Semarang city. The availability of transportation adequately gives a tendency to increase commuting migration rate (Aryanti, 2015).

Based on RTBs data of Public Service Agency (BLU) Semarang city (2013), stating that the number of public passengers inc-

reases. This increasing trend condition of Rapid Transit Busses (RTBs) Passengers in Semarang district shows that most people in that region consider that commuting is a rational choice for someone to have better job and salary.

Commuting migration is very much interesting to be observed and studied. This study aims to figure out some social phenomena related to someone's consideration either remaining in their own region or commuting to other regions to work. The purpose of this study is to analyze the influence of income, education, marital status, land ownership, sex, and age variable upon workers' probability to commute.

RESEARCH METHODS

Population of this study is the work forces settled and having Personal Identification Card (ID) of Semarang District. The samples are taken with *incidental sampling* technique. According to Sugiyono (2009: 85), incidental sampling is a sampling technique based on a coincidence, that is, anyone who incidentally/by chances meets researchers is then considered to be the samples since they have qualifications to be the data sources. The total number of samples used in this study is 100 respondents obtained from workers met by chance taking Rapid Transit Busses (RTBs) departing from Ungaran bus station.

Types of data used in this study are primary and secondary data. The primary data are obtained by conducting direct surveys to the studied areas and interviews based on questionnaires given to the qualified respondents. The secondary data are obtained from relevant departments/agencies such as Bappeda of Semarang district, RTBs of BLU Semarang City, BPS of Semarang District, Manpower and Transmigration Department of Semarang District.

The analysis used in this research is *Logistic Regression Model*, in which depen-

$$Y_i = \frac{e^u}{1 + e^u}$$

Where Y_1 is probability estimated with number of cases (i = 1, ... n) and "u" is common regression equation:

$$u : A + b_1X_1 + b_2X_2 + \ldots + b_kX_k$$

With Constanta A, coefficient bi and independent variable X_j with a number of k (j = 1,... K). Thus, this study is formulated with a function equation model as follows:

$$Y = f(X_1 + X_2 + X_3 + X_4 + X_5 + X_6)$$

While econometric shape model is formulated as follows:

$$Y = \beta_0 + \beta_1 WAGE + \beta_2 EDU + \beta_3 MAR + \beta_4 LAND + \beta_5 SEX + \beta_6 AGE + \mu$$

Where:

Y	= migrating decision
WAGE	= income per month
EDU	= education level
MAR	= marital status
LAND	= land ownership
AGE	= age
SEX	= sex
$\beta_0\beta_0$	= intercept
$\beta_{1,2,3,4,5,6}\beta_{1,2,3,4,5,6}$	=regression coefficient
$\mu\mu$	= error terms

dent variables are in non-parametric or categorical forms. The goal of logistic regression test is to identify variables which are able to distinguish two different groups. Number 1 is given to respondents who commute regularly, and number 0 is given to others.

The dependent variable used in this study is commuting decision measured using *dummy* with value 1 for commuting and 0 for others. The independent variables are income which they receive monthly after working in a destination of commuting area in rupiah; education is length of time required in completing respondents' last education; marital status which is measured using *dummy* number, 1 for married and 0 for others; land ownership which is measured using *dummy* variable, 1 for owning a land and 0 for not owning a land; sex which is measured using dummy variable, 1 for male and 0 for female; age which is based on respondents' date of birth measured in year.

Logistic regression with two options is frequently called *Binary Logistic Regression*. Since models resulted from logistic regression is nonlinear, the equation used to describe them is a little more complex than multiple regression. Variable Y is the probability which obtain two or more outcomes based on non-linear function of linear combination upon a number of independent variables (*predictors*) (Kuncoro, 2007: 236). The general equation for logistic regression with two-option (*Binary Logistic Regression*) results is shown as follows (Kuncoro, 2007: 236).

RESULTS AND DISCUSSION

Respondent Characteristics

Based on results of data processing, the highest number of respondents who receive income of 1,500,000-1,999,999 is 29 percent while the lowest who receive 1,000,000-1,499,999 is 5 percent. Number of respondents who receive the highest income of "≥6.000.000" are 9 percent. Based on educational level, it shows that 46 percent respondents graduate from three-year diploma, 41 percent from Senior/Vocational High School, 8 percent from Junior High School, and 5 percent from Elementary School. Based on marital status, it shows that 60 respondents are married while the other 40 respondents are not. As most respondents are married, they are motivated to earn more income to fulfill their family needs. Based on a land ownership, it shows that 82 percent respondents do not own or cultivate a land while the other 18 percent respondents own or cultivate a land. Based on sex differences, it shows that 57 respondents are females while the other 43 respondents are males. Based on age differences, it shows that 25 percent respondents are at the age of 20-24. In this productive age, they are motivated to work, have better job and more salary. The other 4 percent respondents are at the age of 50-54.

Results of Binary Logistic Regression Analysis

Model Feasibility (*Goodness of Fit*)

From the test results, the value of *Chi Square* (*Hosmer and Lameshow Test*) is 5.758 with the Sig value of 0.674. The Sig value is greater than the alpha (0.05). It means that there is no difference between the predicted and the observed classification. It means that the logistic regression model is sufficient to explain the data and may be used for further analysis.

The *logistic regression* test results formed may explain classifications in value interpretation of dependent variables shown in *overall percentage*. The overall predictive power is 93 percent. 97.7 percent respondents deciding to commute may be predicted accurately with this logistic regression model while those who do not decide to commute may be accurately predicted by 61.5 percent.

Overall Fit Test

The number of initial -2 *Likelihood* (Block Number: 0) is 77,277 while the second -2 Likelihood (Block Number: 1) is 42,396. It means that -2Likelihood 1 < -2 Likelihood 0. Thus, the regression model may be interpreted better (Ghozali, 2011: 341).

The test results of *omnibus tests of model coefficients* show the *chi square* of

34 882 with a significance of 0.000. As the significance value is less than 0.05, it can be concluded that the decision to commute may be predicted from variable of income, education, marital status, land ownership, sex, and age. While Nagelkerke measure shows only 54.7 percent of decision variations is commuting which may be predicted from income, education, marital status, land ownership, sex, and age.

Partial Test

From the results of Binary Logistic Regression models with SPSS 17 analysis device, it shows the following results:

Table 4. Variables in the Equation

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
wage	.000003	.000	4.397	1	.036	1.000
edu	.355	.171	4.278	1	.039	1.427
mar	.303	1.082	.078	1	.780	1.353
land	-1.852	1.004	3.146	1	.076	.157
sex	.607	.911	.443	1	.506	1.835
age	-.076	.049	2.446	1	.118	.926
Constant	-4.814	2.749	3.067	1	.080	.008

a. Variable (s) entered on step 1: wage, edu, mar, land, sex, age.
Source: Primary data, processed, 2015

Parameters used for the partial test this study is by comparing the significance value with the real standard of 5%. The data show that income and education variable significantly influence workers' decision to commute while marital status, land ownership, sex, and age variable have no significant influences. Exp (B) shows that the value of odds ratio, if other variables in constant state, independent variable may influence the dependent variables as much as the value of odds ratio (Imam Ghozali, 2011).

Income Variable Influence Test Results upon Workers' Commuting Decision

Income variable has a coefficient value of 0.000003 with the significance value of 0.036 which is greater than α=5%. It shows that income variable significantly influences workers' commuting decision. The *odds ratio* value or Exp (B) of income variable is 1.000. It means that respondents with more income who decide to commute are once higher than those with lower income. The coefficient positive (+) sign indicates that the higher the income the higher the probability of workers to commute to the city, and vice versa. This is relevant with Todaro's theory that there are income level differences between those in rural and urban areas. Assuming that income expected from city is higher, it results in workers' commuting flows.

Education Variable Influence test results upon workers' commuting decision

Education variable has a coefficient of 0.355 with a significance value of 0.039 which is smaller than α=5%. It shows that education variable significantly influences workers' commuting decision. Exp (B) of education variable is 1.427. It means that respondents with higher educational level interested in commuting are 1.427 times higher than those with lower educational level. The coefficient positive (+) sign indicates that the higher their educational level, the greater their probability to commute to the city, and vice versa. This is relevant with Ravenstein's migration theory that people with higher educational level usually mobilize more than those with lower educational level.

Income and Education Variable Test Results upon workers' commuting decision

From the results of analysis, a logistic regression equation model is formulated as follows:

$$\ln\left[\frac{p}{1-p}\right] = -4.814 + 0.000003 \text{ wage} + 0.355 \text{ edu}$$

\or in the form of p:

$$p = \frac{e^{-4.814 + 0.000003 \text{ wage} + 0.355 \text{ edu}}}{1 + e^{-4.814 + 0.000003 \text{ wage} + 0.355 \text{ edu}}}$$

This model may be interpreted, for example, to determine someone's probability to commute (1) the received income is Rp. 2,000,000 with high school educational level; (2) the received income is Rp. 3,000,000 with high school educational level; (3) the received income is Rp. 2,000,000 with university educational level; (4) the received income is Rp. 3,000,000 with university educational level. Those questions may be immediately answered with the estimation results of the equation above:

So, someone's chance to commute as

$$p = \frac{e^{-4.814 + 0.000003\,(2{,}000{,}000) + 0.355\,(12)}}{1 + e^{-4.814 + 0.000003\,(2{,}000{,}000) + 0.355\,(12)}} \quad (1)$$

p = 0.995

So, someone's chance to commute as his income is Rp. 2,000,000 with high school educational level is 0.995.

$$p = \frac{e^{-4.814 + 0.000003\,(3{,}000{,}000) + 0.355\,(12)}}{1 + e^{-4.814 + 0.000003\,(3{,}000{,}000) + 0.355\,(12)}} \quad (2)$$

p = 0.999

So, someone's chance to commute as his income is Rp. 3,000,000 with high school educational level is 0.999.

$$p = \frac{e^{-4.814 + 0.000003\,(2{,}000{,}000) + 0.355\,(16)}}{1 + e^{-4.814 + 0.000003\,(2{,}000{,}000) + 0.355\,(16)}} \quad (3)$$

p = 0,998

So, someone's chance to commute as his income is Rp. 2,000,000 with university educational level is 0.998.

$$p = \frac{e^{-4.814 + 0.000003\,(3{,}000{,}000) + 0.355\,(16)}}{1 + e^{-4.814 + 0.000003\,(3{,}000{,}000) + 0.355\,(16)}} \quad (4)$$

p = 0.999

his income is Rp. 3,000,000 with university educational level is 0.999.

From above calculations, it shows that workers' commuting probability may increase as respondents' income and education increase as well. Thus, other conditions may also be calculated with logistic regression equation estimated above.

CONCLUSION

Based on results of data analysis and discussions upon factors which influence the probabilities of commuting decision (a case study on workers of Semarang district commuting to Semarang city by RTBs), it can be concluded that income and education variable significantly and positively influence workers' commuting decision to while

marital status, land ownership, sex, and age variable do not significantly influence workers' commuting decision. Assuming that income expected from city is higher, it results in workers' commuting flows. Indicates that the higher their educational level, the greater their probability to commute to the city, and vice versa. This is relevant with Ravenstein's migration theory that people with higher educational level usually mobilize more than those with lower educational level. From the calculations, it shows that workers' commuting probability may increase as respondents' income and education increase as well.

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